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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

FERNSTROM, KURT

ART UNIT	PAPER NUMBER
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3712

DATE MAILED: 07/25/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/932,304	HERMAN ET AL.	
	Examiner	Art Unit	
	Kurt Fernstrom	3712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-102 is/are pending in the application.
- 4a) Of the above claim(s) 73-102 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-29, 31-45, 48-53 and 62-72 is/are rejected.
- 7) ☒ Claim(s) 14, 30, 47 and 54-61 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>5</u> | 6) <input type="checkbox"/> Other: |

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DETAILED ACTION

Election/Restriction

1. Applicant's election with traverse of Group I in Paper No. 7 is acknowledged. The traversal is on the ground(s) that examination of both groups will not present a serious burden to the examiner. This is not found persuasive because a complete and thorough search of all molecular models would be extensive and burdensome. While there are only a handful of subclasses relating to molecular models in Class 434, a proper search requires consideration of non-patent literature as well. Because Group I and Group II are directed to models having fundamentally different structures, and representing different types of molecules, the searches in non-patent literature for Groups I and II would have little if any overlap. Further weighing against examination of both groups is the fact that the groups consist of a total of 102 claims.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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3. Claims 62 and 63 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There does not appear to be any description of the two planes recited in claim 62; nor does the specification describe the rotation of claim 63.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 65-68 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "approximately", used repeatedly in the claims, is indefinite because through each use of the term applicant appears to be claiming a range within which the claimed subject matter falls, while giving no clear standard to enable one to determine what values would fall within the range.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 1, 5, 12 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Barnett. Barnett discloses in Figure 1 and in column 3, line 49 to column 4, line 65 a molecular model comprising first and second elongated strands 10 and 11 extending along first and second paths spaced apart, where each strand corresponds to first and second elements. Barnett further discloses connecting legs 13 extending between the first and second strands, corresponding to the vector along which a force acts on the first element and the second element, the force comprising a hydrogen bond. With respect to claim 5, each strand corresponds to a subset of a plurality of elements. With respect to claims 12 and 13, Barnett discloses in Figures 3-7 and in column 4, lines 47-65 that the model comprises a plurality of segments, each segment having a male slide connector engagement surface 14 and a female slide connector engagement surface 14.

8. Claim 18 is rejected under 35 U.S.C. 102(b) as being anticipated by Rubin. Rubin discloses a molecular model comprising a first elongated tubular strand representing a plurality of alpha carbons and a plurality of bonds and extending along a three dimensional path.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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10. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett in view of Pharos. Barnett discloses all of the limitations of claims 2-4 with the exception of the model being made of a single piece of material, and the use of a free form fabrication method to create the model. Pharos discloses in column 4, line 10 to column 5, line 58 of the specification a method of creating a unitary three dimensional molecular model by creating a digital representation based on three dimensional coordinates, and fabricating the model based on the digital representation using a free form fabrication technique such as stereolithography. See column 5, lines 33-49. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett by creating a unitary molecular model using stereolithography for the purpose of allowing the user to more precisely specify the shape of the model.

11. Claims 6-8, 16-20, 22, 23, 27-29, 34-36, 40, 41, 45, 46, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett in view of Rubin. Barnett discloses all of the limitations of claims 6, 18-20, 27-29, 36, 45 and 46 with the exception of the elements being alpha carbon models. Rubin discloses a molecular model comprising a first elongated tubular strand representing a plurality of alpha carbons and a plurality of bonds and extending along a three dimensional path. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett by providing strands representative of alpha carbon models for the purpose of allowing the user to create a model of a protein. With respect to claims 7, 22 and 40, Barnett fails to disclose the inclusion of side chains attached to a strand.

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Rubin discloses the attachment of side chains to the alpha carbon backbone strand in the second paragraph of page 2384. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett by providing side chains attached to a strand for the purpose of allowing the user to expand the representational capabilities of the model. With respect to claims 16, 34 and 49, it is known to create models of proteins, as shown for example by Rubin. Such a modification would have been obvious for the purpose of allowing the user to model a protein. With respect to claim 17, 35 and 50, while none of the precise proteins claimed are explicitly disclosed by Rubin, Rubin does disclose on page 2385 that the model can be used "to model each of the known protein structures", thus suggesting the protein variations recited in the claims. With respect to claims 8, 23 and 41, Rubin discloses in Figure 1 on page 2381 a spherical member representing a substrate which is coupled to the strand member. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett by providing spherical members attached to a strand for the purpose of more distinctly modeling different elements of the model.

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett in view of Dingman. Barnett discloses all of the limitations of the claim with the exception of the engagement surfaces being joined with a deformable piece of material. Dingman discloses in Figures 11 and 12 and in column 2, lines 8-15 of the specification a molecular model comprising a flexible connecting pin for holding together representations of molecules. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by

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Barnett by providing a deformable connection means the purpose of allowing the user to move the segments with respect to one another while remaining connected together.

13. Claims 21, 32, 33 and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett in view of Rubin, and further in view of Pharos. Barnett as viewed in combination with Rubin discloses all of the limitations of the claims with the exception of the model being made of a single piece of material, and the use of a free form fabrication method to create the model. Pharos discloses in column 4, line 10 to column 5, line 58 of the specification a method of creating a unitary three dimensional molecular model by creating a digital representation based on three dimensional coordinates, and fabricating the model based on the digital representation using a free form fabrication technique such as stereolithography. See column 5, lines 33-49. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett as viewed in combination with Rubin by creating a unitary molecular model using stereolithography for the purpose of allowing the user to more precisely specify the shape of the model.

14. Claims 31 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett in view of Rubin, and further in view of Dingman. Barnett as viewed in combination with Rubin discloses all of the limitations of the claims with the exception of the engagement surfaces being joined with a deformable piece of material. Dingman discloses in Figures 11 and 12 and in column 2, lines 8-15 of the specification a molecular model comprising a flexible connecting pin for holding together representations of molecules. It would have been obvious to one of ordinary

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skill in the relevant art to modify the molecular model disclosed by Barnett as viewed in combination with Rubin by providing a deformable connection means the purpose of allowing the user to move the segments with respect to one another while remaining connected together.

15. Claims 9-11, 24-26, 42-44, 51-53, and 62-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett in view of Rubin, and further in view of Clarke. Barnett as viewed in combination with Rubin discloses all of the limitations of claims 9-11, 24-26 and 42-44 with the exception of the claimed color coding schemes. Various color coding means, including the Corey, Pauling, Kulin color scheme, are well known in the art, as disclosed for example in column 2, lines 19-24 and column 3, lines 48-60 of Clarke. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett as viewed in combination with Rubin by providing a color coding scheme to the atoms for the purpose of allowing a user to more easily distinguish between different types of atoms. Barnett as viewed in combination with Rubin discloses all of the limitations of claim 51 with the exception of the hydrogen bonds being couplable to the backbone units. Rather, the hydrogen bond representing elements of Barnett are attached permanently to the backbone unit. Clarke discloses in Figures 1-7 and in column 3, line 29 to column 7, line 49 of the specification a molecular model comprising a plurality of elements representing hydrogen bonds which are removably attached to representations of elements. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett as viewed in combination with Rubin by providing hydrogen bonds which are removably coupled to the backbone elements for the purpose

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of allowing the user to easily attach and remove hydrogen bonds to the model to more easily create different models of different proteins. With respect to claim 52, Clarke discloses the use of spherical members to represent atoms and tubular members to represent bonds. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett as viewed in combination with Rubin by providing spherical members representing atoms of the backbone elements for the purpose of allowing the user to more easily distinguish between atoms and bonds. With respect to claim 53, Clarke discloses spheres representing each of the claimed elements. It would have been obvious to one of ordinary skill in the relevant art to modify the molecular model disclosed by Barnett as viewed in combination with Rubin by providing spherical members representing a nitrogen atom, an alpha carbon atom, a carbonyl atom and an oxygen atom for the purpose of allowing the user to more easily create different models of different proteins. With respect to claims 62 and 63, Official Notice is taken that it is well known in molecular models to have four representations which do not all lie in the same plane; thus defining two planes as claimed. This feature is also suggested in column 8, lines 44-55 of Clarke. Official Notice is further taken that it is well known to rotate a molecular model about an axis, as disclosed for example in Clarke. With respect to claim 64, Clarke discloses in column 8, lines 44-68 that different angles of rotation may be provided about different bonds of the molecular model. With respect to the particular angles recited in claims 65-67, Clarke discloses in column 9, lines 18-26 that the angles provided may be retrieved from scientific literature, thus suggesting angles which correspond to those naturally occurring in the molecules being modeled. The particular

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numbers of elements in the kit as recited in claims 66 and 68 are considered to be arbitrary choices of design which would have been obvious in light of the prior art for the purpose of enabling a user to create the different types of molecular models. With respect to claim 69, none of the precise side chains claimed are explicitly disclosed by Rubin, Rubin does disclose on page 2385 that the model can be used "to model each of the known protein structures", thus suggesting the side chain variations recited in the claim. Claims 70-72 are obvious for the reasons discussed above concerning claims 9-11, 24-26 and 42-44.

Allowable Subject Matter

16. Claims 14, 30, 47 and 54-61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to disclose or suggest a molecular model having all of the limitations of each of the allowable claims. With respect to claims 14, 30 and 47, the prior art fails to disclose or suggest a molecular model as claimed whereby the segments comprise male and female engagement surfaces which engage in a single orientation, as shown for example in Figure 7. While molecular models are commonly manufactured in connectable segments having male and female engagement surfaces, as shown for example by Barnett, the present invention has the advantage of male and female engagement surfaces which engage in a single orientation, thus yielding the advantage of

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making it easier for users to correctly assemble complicated models. With respect to claims 8, 23 and 41, the prior art fails to disclose or suggest a molecular model as claimed whereby the model comprises a spherical member representing a substrate is coupled to one of the strands. comprise male and female engagement surfaces which engage in a single orientation, as shown for example in Figure 7. With respect to claim 54, there is no suggestion in the prior art of the plurality of female engagements surfaces in the nitrogen atom which have first and second shapes for connecting to different atoms. This feature is best shown in Figures 20b, 21b and 22b, and allows a user to more easily connect an atom properly to different atoms, as discussed in pages 22-24 of the specification. Because this feature is not disclosed or suggested in the prior art, claim 54, and all claims dependent therefrom, contain allowable subject matter.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kurt Fernstrom whose telephone number is (703) 305-0303.

KF

July 24, 2003


Kurt Fernstrom